MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

TOS 1141 – OPERATING SYSTEMS

13 OCTOBER 2016
2.30 a.m. – 4.30 p.m.
(2 hours)

INSTRUCTIONS TO STUDENTS

1. This Question Paper consists of 4 pages including cover page with 7 Questions only.

2. Attempt **ALL** questions in **PART A**.

3. Attempt **ONE** out of **TWO** questions in **PART B**.

4. All questions carry equal marks and the distribution of the marks for each question is given.

5. Please print all your answers in the Answer Booklet provided.

PART A: Answer all questions.

QUESTION 1

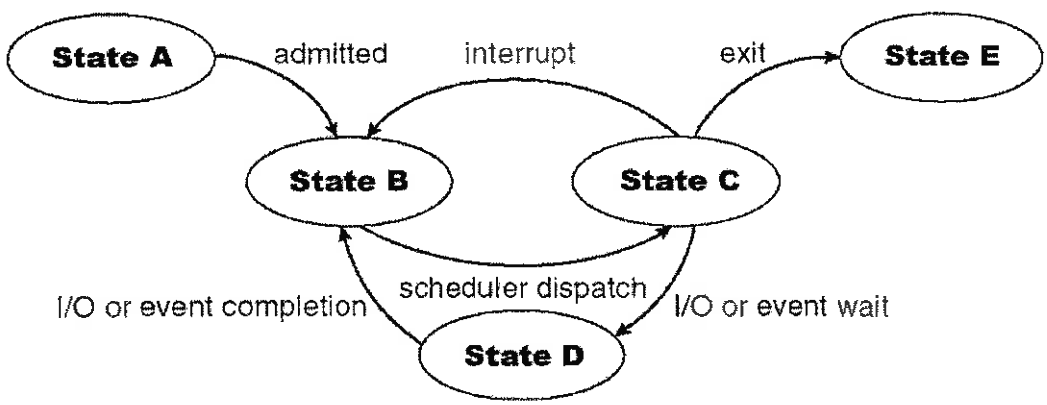
a) List **THREE(3)** goals of operating systems. [3 marks]

b) Identify **FOUR(4)** services provided by operating systems that are helpful to the users. [4 marks]

c) Identify **SIX(6)** system calls for file management in operating system. [3 marks]

QUESTION 2

a) Label **State A – State E** in figure below with process states, as a process is executing. [5 marks]



b) Describe **TWO(2)** types of scheduler and its function in process scheduling. [4 marks]

c) List **TWO(2)** models of inter-process communication. [1 mark]

Continued ....

QUESTION 3

a) Describe **TWO (3)** commonly used scheduling algorithms for processes in computer's CPU. [4 marks]

b) List **FOUR (4)** optimization criteria for scheduling algorithms. [4 marks]

c) Define ***mutex locks*** for synchronisation. [2 marks]

QUESTION 4

a) Define ***allocation method*** for files in a computer. [1 mark]

b) List **THREE(3)** main allocation methods in file systems. [3 marks]

c) Describe each of the allocation method in Q4(b) above. [3 marks]

d) Identify **ONE (1)** suitable situation to use each of the allocation method in Q4(b) above. [3 marks]

QUESTION 5

Consider the following snapshot of a system with **FIVE** processes (*P1, P2, P3, P4, P5*) and **FOUR** resource types (*A, B, C, D*). The system implements banker's algorithm for deadlock detection.

Processes	**Allocation** ***A B C D***	**Max** ***A B C D***	**Need** ***A B C D***	**Available** ***A B C D***
P0	0 0 1 2	0 0 1 2		1 5 2 0
P1	1 0 0 0	1 7 5 0		
P2	1 3 5 4	2 3 5 6		
P3	0 6 3 2	0 6 5 2		

a) Identify the total number of instances for each resource type. [2 marks]

b) Identify the content of a column ***Need***. [2 marks]

c) Illustrate a sequence of processes that will get the system info a ***safe state***, if there is any. Show all required steps. [6 marks]

Continued ....

PART B: Answer only ONE out of TWO questions.

QUESTION 6

Given a cache that contains **THREE** frames, and a reference string: 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1.

a) Illustrate the **First-in-first-out (FIFO)** page replacement algorithm. [4 marks]

b) Illustrate the **Least-recently-used (LRU)** page replacement algorithm. [4 marks]

c) Identify the page faults for FIFO and LRU page replacement algorithms respectively. Compare the performance of both algorithms. [2 marks]

QUESTION 7

Given a disk with sector numbered from 0 until 199, and a request queue: 98, 183, 37, 122, 14, 124, 65, 67. Assume that the head pointer is at sector 53.

a) Illustrate **First-come-first-serve (FCFS)** disk scheduling algorithm. [4 marks]

b) Illustrate **Shortest-seek-time-first (SSTF)** disk scheduling algorithm. [4 marks]

c) Identify the total head movements for FCFS and SSTF disk replacement algorithms respectively. Compare the performance of both algorithms. [2 marks]

End of Paper.